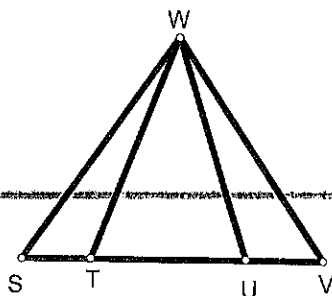


Name \_\_\_\_\_

Date \_\_\_\_\_

**Isosceles Triangle proofs**

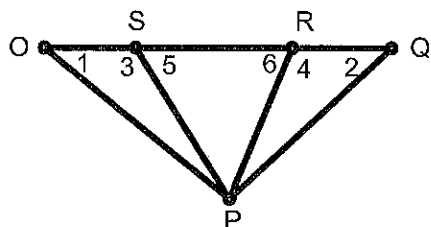
1. Given:  $\overline{WT} \cong \overline{WU}$  and  
 $\overline{SU} \cong \overline{VT}$   
 Prove:  $\triangle SUW \cong \triangle VTW$



Statements

Reasons

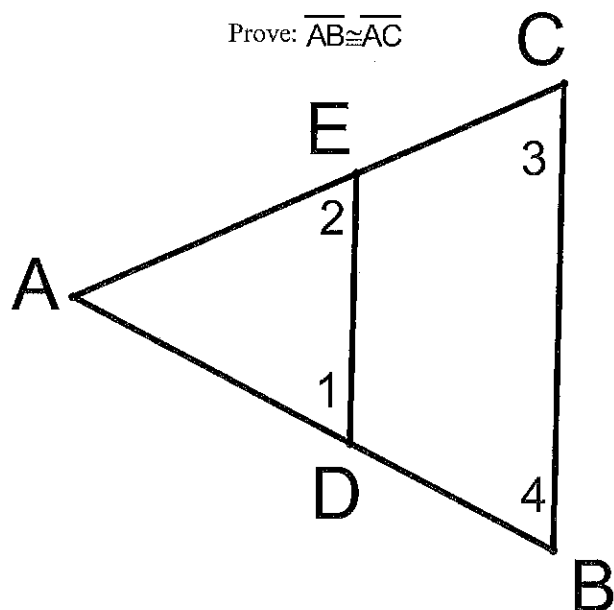
2. Given:  $\angle 1 \cong \angle 2$ ,  $\angle 3 \cong \angle 4$

Prove:  $\triangle OPS \cong \triangle QPR$ 

Statements

Reasons

3. Given:  $\angle 1 \cong \angle 2$ ;  $\overline{DE} \parallel \overline{BC}$

Prove:  $\overline{AB} \cong \overline{AC}$ 

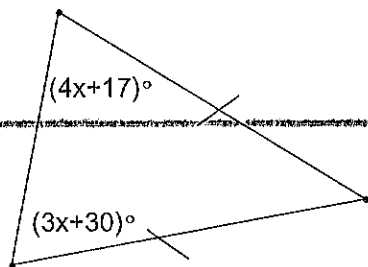
Statements

Reasons

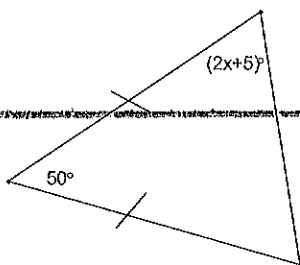
## Isosceles Triangle Theorem and the Converse

Solve for  $x$ . Show all work.

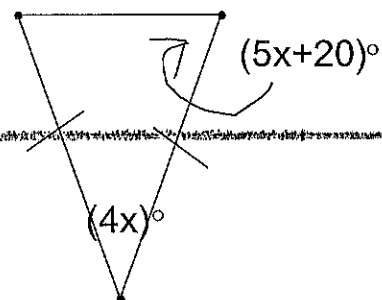
4. \_\_\_\_\_



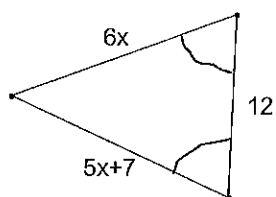
5. \_\_\_\_\_



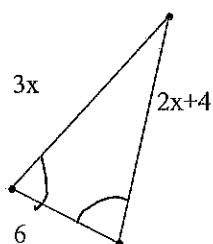
6. \_\_\_\_\_



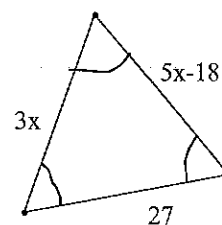
7. \_\_\_\_\_



8. \_\_\_\_\_



9. \_\_\_\_\_



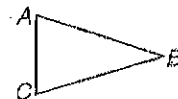
## 4-6

## Study Guide and Intervention

## Isosceles Triangles

**Properties of Isosceles Triangles** An isosceles triangle has two congruent sides. The angle formed by these sides is called the **vertex angle**. The other two angles are called **base angles**. You can prove a theorem and its converse about isosceles triangles.

- If two sides of a triangle are congruent, then the angles opposite those sides are congruent. (**Isosceles Triangle Theorem**)
- If two angles of a triangle are congruent, then the sides opposite those angles are congruent.

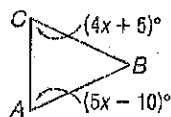


If  $\overline{AB} \cong \overline{AC}$ , then  $\angle B \cong \angle C$ .

If  $\angle B \cong \angle C$ , then  $\overline{AB} \cong \overline{AC}$ .

**Example 1**

Find  $x$ , given  $\overline{BC} \cong \overline{BA}$ .



$BC = BA$ , so

$$m\angle A = m\angle C.$$

Isos. Triangle Theorem

$$5x - 10 = 4x + 5$$

Substitution

$$x - 10 = 5$$

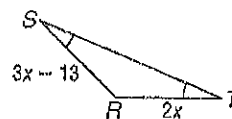
Subtract  $4x$  from each side.

$$x = 15$$

Add 10 to each side.

**Example 2**

Find  $x$ .



$m\angle S = m\angle T$ , so

$$SR = TR.$$

Converse of Isos.  $\Delta$  Thm.

$$3x - 13 = 2x$$

Substitution

$$3x = 2x + 13$$

Add 13 to each side.

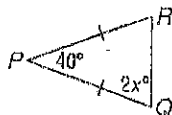
$$x = 13$$

Subtract  $2x$  from each side.

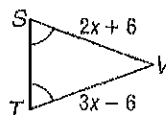
**Exercises**

Find  $x$ .

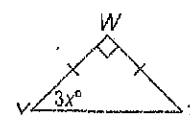
1.



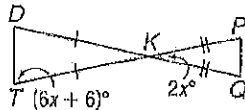
2.



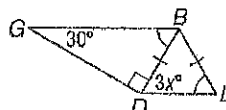
3.



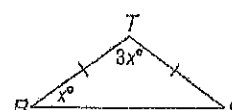
4.



5.



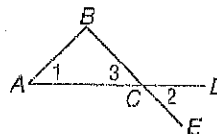
6.



7. Write a two-column proof.

Given:  $\angle 1 \cong \angle 2$

Prove:  $\overline{AB} \cong \overline{CB}$



Statements

Reasons

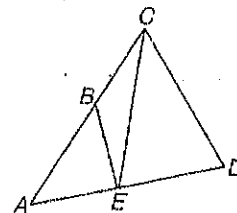
4-6

# Skills Practice

## Isosceles Triangles

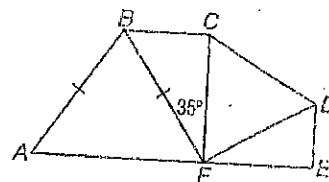
Refer to the figure.

1. If  $\overline{AC} \cong \overline{AD}$ , name two congruent angles.
2. If  $\overline{BE} \cong \overline{BC}$ , name two congruent angles.
3. If  $\angle EBA \cong \angle EAB$ , name two congruent segments.
4. If  $\angle CED \cong \angle CDE$ , name two congruent segments.



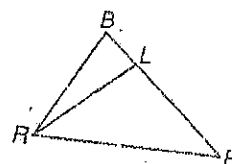
$\triangle ABF$  is isosceles,  $\triangle CDF$  is equilateral, and  $m\angle AFD = 150$ . Find each measure.

5.  $m\angle CFD$
6.  $m\angle AFB$
7.  $m\angle ABF$
8.  $m\angle A$



In the figure,  $\overline{PL} \cong \overline{RL}$  and  $\overline{LR} \cong \overline{BR}$ .

9. If  $m\angle RLP = 100$ , find  $m\angle BRL$ .
10. If  $m\angle LPR = 34$ , find  $m\angle B$ .



11. Write a two-column proof.

Given:  $\overline{CD} \cong \overline{CG}$

$\overline{DE} \cong \overline{GF}$

Prove:  $\overline{CE} \cong \overline{CF}$

